It's the Season of Giving Gifts: Share Acquisition by VCs at the Time of the IPO

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Abstract

This paper examines the neglected but important topic of large shareholders including VC firms acquiring shares at the time of Initial Public Offerings (IPOs). Using gift exchange theory, we develop arguments to explain the motivation and outcome for VC purchases in IPO firms at time of IPO. Using a unique set of hand-collected IPO data, we find higher underpricing in IPOs where VC firms acquire shares at the offer price than a comparable set of matched VC-backed IPOs selected based on firm size, SIC, and IPO year without share acquisition. We also find that VCs are likely to acquire shares in underpriced firms with a higher IPO premium and a subsequent higher long-run aftermarket performance, thus indicating the higher quality of acquired IPO firms. Further, although IPO firms where acquiring VCs have a former business relationship with the underwriter are more underpriced, they have a higher IPO premium and long-run performance. This suggests that prior relationships tend to imbue stronger future gift giving as VCs benefit from loyalty to their underwriters' network and also are able to use their expertise in the post-IPO period to profit.

Keywords: Gift exchange, share acquisition, VC-underwriter relationship, underpricing, long-run performance, agency theory.

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I- Introduction

Venture capital firms (henceforth VCs) invest in early stage companies, supporting their growth before exiting through a sale, liquidation, or an initial public offering (henceforth, IPO). Prior research concentrates on the certification versus grandstanding role played by VC firms taking their portfolio companies public, and potential agency problems associated with VC "exit". However, VCs may also acquire shares at IPO, and sometimes without having a prior investment. While an extensive literature has now developed on private placements to VCs by existing publicly listed corporations (PIPEs) (e.g. Dai, 2007; Dai et al., 2010), little is known about the role played by VCs who acquire shares at the time of IPO. Accordingly, this paper develops theory to explain why VCs acquire shares on IPO and examines the association between VC share acquisition on IPO and both short- and long-term performance of the targeted IPO firm. Using gift exchange theory (Mauss, 1923), we develop arguments to specify how the existence of previous exchanges leads to higher economic rewards for VCs. Moreover, our theorizing leads us to hypothesize the impact on IPO performance.

While gift exchange theory provides insight into the underwriter/VC relationship (particularly as it relates to the context of our paper), it also provides insight into reasons for agency issues arising between underwriters and issuing firms. From an agency perspective, underwriters may use the discretionary allocation provision of the book-building procedure to establish their network. As such, underwriters may offer more underpriced shares to institutional investors, such as VCs, with whom they had former business relationships.

As participation of VCs in acquiring shares at the time of IPO is a costly decision, they are only likely to do so if they perceive the quality of the firm going public. Some VCs might not have the

opportunity to participate in pre-IPO financing rounds where larger and more experienced VCs do not need to syndicate. These 'excluded' VCs might thus be interested in participating in the aftermarket growth prospects of the IPO firm. Within this framework, underwriters may use their network of related VCs to place equity in good quality issuing firms, while developing relationships of loyalty with VC investors. This is the essence of a gift which opens the door for reciprocation. Indeed, a long-term relationship between the underwriter and professional investors is a valuable asset with benefit to all parties involved in an IPO process. On one hand, loyalty could reduce the cost of placing an IPO for an underwriter. On the other hand, it could improve the stability of post-IPO investors as well as the quality of support provided to the issuing firm following the IPO.

Using a Heckman treatment effect model to control for self-selection bias, we verify whether VC firms, the typical institutional investors at IPO, acquire shares in more underpriced deals, and whether acquired firms have a higher IPO premium and long-run performance than benchmark IPOs. We further investigate whether the association between short-and long-run performance and VC share acquisition is differentially affected by the existence of a former relationship between the underwriter and the acquiring VC firm. We also verify whether more experienced VCs are likely to identify better opportunities and help firms generate higher long-run performance.

The main contributions of the paper are four-fold. First, using a unique dataset of 114 IPOs from 1990 to 2008, including 57 IPOs with VCs acquiring shares at issuance and their matched VC-backed IPOs with no such acquisitions, this is the first paper to our knowledge that examines a unique setting in the VC industry: VC share acquisition at IPO. Within this context, we show that

VCs are likely to acquire shares in more underpriced IPOs, and that this is positively related to IPO premium and long-run aftermarket performance.

Second, we extend understanding of the role of VC experience. Specifically, while prior research has focused on the experience of VC firms in sourcing portfolio companies and taking them public (Lerner 1994; Gompers, 1996; Hochberg, Ljungqvist, and Lu, 2007; Sorensen, 2007), we show evidence that experience of acquiring VCs matters. We identify both higher IPO underpricing and IPO performance in firms with share acquisition by more experienced acquiring VC firms, whether the VCs are already pre-IPO shareholders or new shareholders on IPO. These findings indicate that experienced VCs are likely sought after by underwriters and given better "gifts" in exchange for future reciprocation. Moreover, experienced VCs are able to use their expertise to generate greater market performance (Hsu, 2004).

Third, we add to the neglected area of underwriter-investor relationships. Specifically, we highlight the existence of loyalty or collaborative behavior in the underwriter-VC relationship which arises in a gift exchange setting. This is reflected in higher underpricing in firms with higher share acquisition by VC firms that have a former relationship with the underwriter, and higher IPO premium and long-run performance of the issuing firm.

Finally, in addition to these specific contributions we make a general contribution in extending gift exchange theory by showing that prior relationships tend to imbue stronger future gift giving. This is reflected by the fact that prior relationships between underwriters and VCs lead to higher underpricing and superior longer-term performance in IPOs.

The remainder of the paper is organized as follows. In Section 2 we present the review of prior literature which discusses IPO underpricing and share acquisition. In section 3 we develop our arguments using gift exchange theory to generate hypotheses. In Section 4 we explain the database and methodology and test our hypotheses. We then discuss our empirical results in Section 5. In section 6 we conclude.

II- Review of Literature: IPO Performance and VC Shares Acquisition at IPO

VCs are argued to be smart investors able to sort and invest in better companies (Sorensen, 2006). VCs participate in start-up firms to finance their growth and development. As such, they offer portfolio companies a powerful set-up to convert ideas into tangible products and services. VC investments may be staged during the private company phase of a venture's development (Sahlman, 1990; Cummings and Dai, 2012), or, through the issuance of shares to VCs by established publicly listed firms (Dai, 2011).

Previous studies suggest a certification effect of VCs that would reduce underpricing (Megginson and Weiss, 1991). This is in contrast with recent studies that identify a positive effect of VC presence on underpricing. Less experienced VCs may take firms to market earlier than more established VCs in order to raise their profile and be able to raise further funds (Gompers, 1996). Loughran and Ritter (2002) suggest that some pre-IPO investors such as VCs may seek to extract rents through deliberate higher underpricing for preferential share allocation in subsequent underpriced IPOs. Their study and others (e.g. Lee and Wahal, 2004) develop a corruption hypothesis involving a conflict of interest between VCs and IPO firms.

There is some debate about the trade-off between shareholder concentration and liquidity and the incentives to monitor in IPO firms (Maug, 1998; Pagano and Roell, 1998). There is also debate about the use of underpricing to determine post-IPO ownership structure, and as a consequence to influence subsequent monitoring of the IPO firm. Brennan and Franks (1997) contend that underpricing is related to the extent of shareholder dispersion as IPO firms seek to protect themselves from hostile takeover. High underpricing may lead to oversubscription which helps facilitate more dispersed shareholdings and a reduced acquisition threat (Boulton et al, 2010).

In contrast, Stoughton and Zechner (1998) find greater underpricing results from share allocation to blockholders. Field and Sheehan (2004) and Hill (2006) provide evidence that IPO underpricing is at best weakly related to ownership structure of the post IPO firm. Hill (2006) suggests that other explanations for IPO underpricing be sought, but while she considers blockholdings does not consider acquisitions by VCs.

We extend these earlier studies by advancing an alternative explanation that presents gift exchange as an antecedent to the corruption hypothesis. We suggest that underwriters view share allocation in certain IPOs as a way to initiate new relationships with younger VC firms and further as a way to cement stronger loyalty for existing relationships with VCs. By providing buy-in to better IPOs, underwriters create an expected reciprocation wherein VCs bring their promising new ventures to the underwriter for IPO underwriting. The underlying argument here is that the initial gift may be less extravagant (e.g. may not provide as high a return for VCs who buy-in) compared to future gifts which are reciprocated over time. In other words, VCs who reciprocate will be offered buy-in to subsequent deals which will provide VCs an even higher payoff. Accordingly, the relationship becomes more profitable for VCs over time and allows underwriters to develop increasing power as it relates to their IPO pricing.

III- Gift Exchange: Hypotheses

3.1. How IPO Shares Act as Gift

Gift exchange theory, as its name implies, describes the nature and implicit rules of behavior regarding gift giving among parties (Mauss, 1923). The theory has been used by sociologists and anthropologists to explain the antecedents and outcomes associated with gift exchange not only in ancient societies but in modern economies as well (Van de Ven, 2000). More recently, Ferrary (2003; 2009) extended gift exchange theory to VC syndicate investing and showed that offers for syndication among VCs create reciprocal benefits. A gift can have multiple purposes and motivations and game theorists have proposed how different motivations can affect outcomes. One of the primary purposes of gift exchange, however, is to establish trust between parties (Camerer, 1988). An initial gift by one party provides a signal that a relationship is desired and the giving party is ceding something that would appear prima facie to be free. This "free" gift has an implicit expectation for reciprocation at an unknown future date so that the gift is not merely an economic exchange but rather a socialized exchange. By accepting the gift, the receiver implicitly ties his or her reputation to returning the favor in the future. Failure to do so (to reciprocate in the future) leads to a loss of reputation in the community and can lead to censure and other negative consequences (Ferrary 2003).

We view the underwriter's offer of shares in a promising IPO as a form of a gift to VCs. Because underwriters are privy to information about the IPO and the demand for its shares arising through the book-building process, underwriters are positioned to understand whether an IPO's shares are likely a good candidate for a gift. Those IPO firms which are stronger and can compete well after the IPO are likely to provide positive returns for investors who would buy in

at the time of the IPO. Moreover, when underwriters have greater power over the pricing of shares (as would occur when pre-IPO VCs have a relationship with the underwriter), underwriters can set a lower relative offer price to allow for greater underpricing and share price appreciation for investors who buy in at the time of the IPO. Traditionally, underwriters may promote underpricing to gain favor with institutional investors (Brau and Fawcett, 2006) and we view this as an implicit gift.

Hypothesis 1a: Underpricing is positively related to share acquisition at IPO by VCs.

Hypothesis 1b: IPO Premium is positively related to share acquisition at IPO by VCs.

Hypothesis 1c: Long-run aftermarket Performance is positively related to share acquisition at IPO by VCs.

3.2. VC Share Acquisition at IPO, and the Association between VC and Underwriter: The Effects of Gift Reciprocation

As noted above, an initial gift is a way to establish trust between parties. Once the gift is accepted, reciprocation is expected in the future. The underwriter which has provided a VC with buy-in to an IPO that performs well will expect the VC to reciprocate in the future by bringing new ventures to the underwriter for underwriting. Because reciprocation may not be forthcoming, however (Van de Ven, 2000), the initial gift giver has an incentive to limit the size of the initial gift. In other words, the original gift giver will prefer to avoid higher losses if the receiver never reciprocates. For the underwriter, the gift of attractive shares to a focal VC that does not reciprocate represents an opportunity cost in that those shares could have been given to another institutional investor (for reciprocal benefits) or the shares could have been purchased by

the underwriter for its own economic profit. As such, the underwriter can limit the size of the initial gift to a new VC by providing buy-in to a good (but not necessarily great) IPO. In essence, the underwriter can manage which VCs get buy-in based on the level of trust that has been established. Once VCs reciprocate and provide a new venture for underwriting, trust develops further between the two and loyalty ensues.

We believe trust strengthens between the two when VCs not only bring new ventures to the underwriter but also provide accurate information about the venture so that underwriters can exhibit greater control over share pricing in any IPO. This allows underwriters to invite VCs with whom they have a prior relationship to the road-show and may allow them to use their discretionary allocation power to serve various VCs (with whom they have developed trust) stocks in underpriced IPOs. In this way, underwriters who have a trusting relationship with one VC can use this relationship to enhance their relationships with other VCs. Accurate underpricing represents a challenge for underwriters and good underwriters will seek to achieve accurate pricing in order to enhance their reputation with investors. Underwriters can use book building through favored investors with whom they have long term relationships in order to maximize the information they need for accurate pricing at minimized cost (Sherman and Titman, 2002). In particular, VCs as specialist, informed investors may be better able to collect accurate costly information on IPO companies with limited track records and uncertain future prospects prior to purchasing shares.

We believe underwriters will begin to favor VCs with whom they have close relationships as they believe that the information revealed will be more accurate. Moreover, the effects of trust developed over time through gift exchange will lead to a willingness to provide better gifts in the

future. Accordingly, when VCs who have a longer relationship with underwriters acquire shares at IPO, those IPOs are more likely to have a higher IPO discount, i.e., higher underpricing, but also higher growth opportunities, i.e., IPO premium, and greater long-run performance.

Hypothesis 2a: The positive association between underpricing and share acquisition at IPO by VCs is stronger in IPOs where the acquiring VC has a former relationship with the underwriter.

Hypothesis 2b: The positive association between IPO premium and share acquisition at IPO by VCs is stronger in IPOs where the acquiring VC has a former relationship with the underwriter.

Hypothesis 2c: The positive association between the long-run aftermarket performance and share acquisition at IPO by VCs is stronger in IPOs where the acquiring VC has a former relationship with the underwriter.

Our theorizing to this point has provided insight into how a gift first establishes trust and then develops this trust further over time through reciprocal relations. The outcome of this process is that smaller gifts (from the underwriter) in the form of buy-in to attractive IPOs are offered first and then more attractive gifts in the form of buy-in to very attractive IPOs are offered later. One additional extension to gift exchange theory in this context is to understand that status matters (Van de Ven, 2000). Status is directly tied to the reputation of VCs and this reputation is gained over time by experience (Sorenson and Stuart, 2001). As Ferrary (2003) notes, a stronger reputation allows VCs to "attract the best projects, to raise the biggest funds, and to induce other economic agents to collaborate with them" (Ferrary 2003: 122). As such, we believe that those VCs with a stronger reputation will naturally receive better gifts. VCs with a higher reputation that enjoy a former tie to the underwriter will receive buy-in to very attractive IPOs. Moreover,

we believe that VCs with a higher reputation that have no preexisting tie with the underwriter will be courted with offers of better gifts (e.g. buy-in to very attractive IPOs). Underwriters will seek to secure a relationship with these VCs and so we hypothesize the following.

Hypothesis 3a: The positive association between underpricing and share acquisition at IPO by VCs is stronger in IPOs where the acquiring VC has a higher reputation.

Hypothesis 3b: The positive association between IPO premium and share acquisition at IPO by VCs is stronger in IPOs where the acquiring VC has a higher reputation.

Hypothesis 3c: The positive association between the long-run aftermarket performance and share acquisition at IPO by VCs is stronger in IPOs where the acquiring VC has a higher reputation.

IV- Data and Methodology

3.1. Data Sources

The database includes a sample of 114 VC-backed IPOs from 1990 to 2008 in the US markets, in order to examine long-run aftermarket performance. To select the sample, we followed a multi-stage collection procedure, where we first identify the list of all IPOs in the U.S. markets from the Securities Data Company (SDC) database over the studied period. This represents a total of 7779 IPOs up to 2008. In line with prior IPO research, we exclude REITs, ADRs, closed-end funds, unit offerings, financial IPOs, and those with an offer price of less than five dollars. We also exclude carve-outs and spin-offs as these behave differently from regular IPOs as they involve the flotation of parts of mature businesses. This leaves 5257 IPOs up to 2008. We then review individually all the prospectuses collected from Lexis-Nexis database for the studied

IPOs, and we focus on those IPOs where the table "PRINCIPAL AND SELLING STOCKHOLDERS" in the prospectus shows an increase in the share ownership of a (existing or new) VC firm around the IPO date (After versus Before offering). The final sample represents some 1.1% of the entire IPO population during the period under study and consists of 57 IPOs, for which we identified a closely comparable IPO firm where there was no share acquisition by investors on IPO, using the closest comparable firm in terms of size (+/-25% of the IPO firm market capitalization at offer), SIC 4-digits code, and IPO date (within the one year period around the IPO date). The final sample includes 114 IPOs.

3.2. Methodology

To verify the effect of VC share acquisition on IPO performance, we use the following model, and include interaction variables between VC share acquisition and the remaining variables to test our various hypotheses:

$$\begin{aligned} \textit{IPO Performance} = \alpha &+ \beta_1 \times \textit{VC Share Acquisition}_i + \beta_2 \times \textit{VC-related to Underwriter dummy}_i \\ &+ \beta_3 \times \textit{New Acquiring VC Experience}_i + \beta_4 \times \textit{Existing Acquiring VC Experience}_i \\ &+ \beta_5 \textit{ Control variables}_i + \varepsilon_i \qquad (1) \end{aligned}$$

Where IPO Performance is calculated for each firm (i) using both underpricing and the buy-and-hold abnormal return, for short- and long-term performance, respectively. In line with the prior IPO literature, the dependent variable, *Underpricing*, is equal to the ratio of the difference between the price at the end of the first day of trading and the offer price over the offer price. We also use IPO premium as a proxy for short-term performance. The IPO Premium is defined as the

difference between the offer price and the book value per share expressed as a fraction of the offer price.

The buy-and-hold abnormal return, BHAR, is equal to the aftermarket performance adjusted by a portfolio of comparable IPO firms for each firm and calculated over the one-, and two-year period following the closing price of the first day of trading. Comparable firms are VC-backed IPOs selected based on firm size, SIC, and IPO year.[1]

VC Share Acquisition is equal to the fraction of shares acquired out of the number of shares offered at the time of IPO. *VC-related dummy* is equal to one if the acquiring VC firm was involved in an IPO managed by the underwriter during the two-year period prior to the IPO date, zero otherwise.[2] Since pre-IPO VC ownership is a possible way to reduce the agency problems caused by the separation of ownership and control, we control for the difference in share acquisition between new and existing VCs in the IPO firm. Empirical tests use *New Acquiring VC Experience*, and *Existing Acquiring VC Experience* which are equal to the number of IPOs in which acquiring VC were involved prior to the IPO date.[3] To normalize both variables, empirical tests use the natural logarithm of one plus *New Acquiring VC Experience*, and the natural logarithm of one plus *Existing Acquiring VC Experience.* The number of IPO deals is likely to

[1] Further empirical tests were run using buy-and-hold abnormal return adjusted using the value weighted CRSP index. The results are consistent but less significant than the findings of the present paper, and they remain available upon request.

[2] In further investigations, VC-related to underwriter dummy was calculated over four- and six-year periods, and the results remain consistent and available upon request.

[3] In further robustness tests, we use New VC dummy which is equal to one if Pre-IPO VC Ownership is equal to zero, and one otherwise. The results remain consistent with the present results of the paper and they are available upon request.

give VC firms great visibility in the market (Megginson and Weiss, 1991), and thus offers them better access to profitable investment opportunities (Hsu, 2004). This suggests that share acquisition by more experienced VCs is likely to send a stronger signal about the quality of acquired IPOs. Moreover, IPO firms may benefit from greater post-IPO monitoring provided by more experienced VC firms (Sorenson and Stuart, 2001). We thus expect IPO performance to be positively related to VC experience, and we don't expect significant differences in the effect of experience on IPO performance between new and existing acquiring VCs.

In terms of firm characteristics, we use the following variables commonly used in the IPO literature: *Market Capitalization* is used as a proxy for firm size and is the natural logarithm of market capitalization calculated at the offer price. Since larger companies are more mature and have more available information, they are likely to have a better IPO performance. A *Hi-Tech dummy* controls for the presence of higher asymmetric information in such firms and its likely effect on IPO performance, and is equal to one if the IPO firm is a hi-tech firm, zero otherwise.[4] Prior research indicates that pre-IPO operating losses reflect the riskiness of IPO firms (Chahine and Goergen, 2011). We use a *Loss dummy* equal to one if the IPO firm had operating losses in the last year prior to the IPO date, zero otherwise. Since leverage may play a monitoring role (Jensen, 1986), and thus improve IPO performance, empirical tests also control for firm leverage. *Pre-IPO Leverage* is equal to pre-IPO long-term debt expressed as a fraction of pre-IPO total assets, both measured in the year preceding the IPO date. We further control for growth

[4] In line with Loughran and Ritter (2004), Hi-Tech stocks are defined as those with SIC codes 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3671, 3672, 3674, 3675, 3677, 3678, 3679 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 3841, 3845 (medical instruments), 4812, 4813 (telephone equipment), 4899 (communications services), and 7371, 7372, 7373, 7374, 7375, 7378, and 7379 (software).

opportunities of the IPO firm using *Price-to-Sales Ratio*, which is equal to the market capitalization calculated based on the offer price over the last annual Sales revenue as reported in the IPO prospectus. Dolvin and Jordan (2008) argue that the higher underpricing level during the late 1990s was driven by the increase in the pre-IPO owners retained wealth relative to the gross proceeds (i.e. economic overhang). We therefore control for *Overhang* which is equal to the ratio of shares outstanding before the offer to the number of shares offered. CEO involvement may also reduce the agency problems related to the separation of ownership and control (Mehran, 1995). Empirical tests include *Pre-IPO CEO Ownership* which is calculated as a fraction of the shares outstanding prior to the IPO as specified in the IPO prospectus. *Underwriter Reputation* is calculated based on Carter and Manaster (1990) and Loughran and Ritter (2004), where more prestigious underwriters are expected to certify the quality of managed offerings and thus causing a better IPO performance. *Underwriter Reputation* is a continuous variable ranging from 0 to 9 (from less to more prestigious underwriters). A *Bubble Period Dummy* is also included and controls for the effect of the internet bubble in 1999-2000, when underpricing was highest (Loughran and Ritter, 2002, Lowry and Schwert, 2004).

The decision of a VC firm to acquire shares is not however exogenous. For example, VCs likely acquire shares in good companies that were not able to benefit from former support due to high geographic distance from VC clusters. Further empirical investigations control for this endogeneity of the VC decision to acquire shares at IPO using a two-step Heckman regression model. We argue that IPO firms located far from VC clusters are less likely to obtain pre-IPO VC financing and may thus attract VC investors at IPO.[5] Firms with greater pre-IPO VC

[5] This is in line with prior research in Lee and Masulis (2011) Chahine et al. (2012) who argue that IPO firms that are close to clusters are more likely to have VC syndicates.

syndicate experience are also less likely to need or attract VC share acquisition at the time of IPO. As such, we use two instruments for pre-IPO VC financing in the Heckman two-step regression. On one hand, we include *Pre-IPO VC Syndicate Experience* measured as the cumulative number of IPOs in which VC syndicate members were involved prior to the IPO date. On the other hand, we include a *Firm Location dummy* equal to one for an IPO firm's location in California and Massachusetts in the US, zero otherwise. In the first step of our Heckman model, we estimate the selection equation using a probit regression to model whether an issuing firm will have VC shares acquisition at IPO or not. Using the estimation result from the first step, we construct the self-selection correction term, i.e., lambda or the inverse Mills ratio. This term is added as an explanatory variable in the second-step OLS regression of IPO performance in Equation (1) to correct for the selection bias due to endogeneity.

V- Empirical Results

4.1. Descriptive Statistics

Table 1 indicates that VCs acquired on average 8.2% of shares issued for the sub-sample of IPOs with VC share acquisition. In a significant fraction of these IPOs (38.6%), VCs acquiring shares had a historical IPO relationship with the underwriter within the two years prior to the IPO date, and 19.3% of acquiring VCs are new investors without a former relationship with the IPO firm. Although not shown in Table 1, VCs held an average of 36% of shares prior to the IPO date, and 63.2% of acquiring VCs had a significant involvement in the governance of the IPO through holding a director position. New Acquiring VCs were involved in an average of 7.8 IPOs, whereas existing acquiring VCs were involved in 16 IPOs prior to the focal IPO.

Table 1 Near Here

In terms of firm characteristics, the average firm in our sample went public at a market capitalization of $443.37 million, and after 14.73 years from inception. Moreover, 49.1% of the sample had a negative operating profit in the last year prior to IPO; were managed by a reputable underwriter (ranked 7.912, where of 9 is the highest ranking), and 32.5% went public during the bubble period 1999-2000. Moreover, an average firm has 24% of the assets financed with debt; goes public at a price-to sales ratio of 0.897, offers around one third of its shares outstanding (3.122 overhang), and has a pre-IPO CEO Ownership of 14.9%. Comparing both sub-samples, VCs are more likely to acquire shares in older companies (*p=1%*), firms going public at a higher price-to-sales multiple (*p=10%*), a greater overhang (*p=5%*), and those with a smaller pre-IPO CEO ownership (*p=10%*), but there is no significant difference between both sub-samples for the other variables.

Table 1 indicates an average underpricing of 18.3%, consistent with prior IPO literature (Chahine and Goergen, 2011). Underpricing is significantly higher in IPOs with VC share acquisition than the matched IPO sample (*p=5%*). Similarly, there is a positive buy-and hold abnormal return over the one-, and two-year periods. Although more underpriced, firms with VC acquisition, at the time of their IPOs, have a weakly better long-run performance than those without VC acquisition (at the 10% level or more).

Interestingly, the descriptive statistics related to the instruments used in the empirical investigations show that firms with VC share acquisition have a lower pre-IPO VC syndicate experience (*p=5%*), and are less likely to be located in California and Massachusetts than those with VC share acquisition (*p=10%*). Although not shown in Table 1, the experience of pre-IPO

VC syndicate of firms attracting new VC firms was very limited reaching an average pre-IPO experience of 12 deals (a median value of zero), and this is significantly lower than the average experience of VC syndicate in other IPOs with existing acquiring VCs (21.5 deals on average and 10.5 deals in median value). For example, eight out of eleven IPOs with a new VC share acquisition were not VC-backed prior to their IPOs. Except for one IPO with a significant pre-IPO VC syndicate experience (a cumulative number of 13 deals), the remainder had almost zero or limited IPO experience.

Table 2 exhibits the correlation coefficients between the different studied variables in the model. This shows that VC share acquisition is positively correlated with underpricing, premium, and the buy-and-hold abnormal returns over a one-, and two-year period. Moreover, there is a positive correlation between both short-term and long-run IPO performance variables and the existence of a former relationship between the VC firm and the underwriter. The remaining correlation coefficients exhibit signs that are consistent with prior IPO literature, and the VIF is lower than 1.83 thus rejecting potential multi-collinearities in the model.

Table 2 Near Here

4.2. VC Share Acquisition and IPO Performance

Table 3 presents the empirical results following the Heckman (1979)'s two-step procedure. Model (1) includes the results of the first-step probit regression, used to calculate the inverse Mills ratio, which is included in the second-step OLS regressions of IPO short- and long-term performance.

Model (1) shows that the probability of VC share acquisition at the time of IPO is positively related to firm size (*p=5%*), firm age (*p=1%*), price-to-sales ratio (*p=10%*), and overhang (*p=5%*), and is negatively related to loss dummy, pre-IPO leverage, and pre-IPO CEO ownership (at the 10% level or more). Further, Model (1) indicates that firms located in California and Massachusetts or those with greater pre-IPO VC Syndicate experience are less likely to have VC share acquisition at the time of IPO (at the 1% and 5% levels, respectively), where the firm location and pre-IPO VC Syndicate Experience are used as instrument variables to control for the endogeneity of share acquisition.

Table 3 Near Here

Model (2) includes the regressions for underpricing as a proxy for short-term performance, and including lambda, the inverse Mills ratio. In line with Hypothesis (1a), there is a positive association between underpricing and VC share acquisition, which suggests that VCs acquire shares that are more underpriced (*p=5%*). Moreover, underpricing is strongly higher in IPOs where acquiring VCs are related to the underwriter managing the offering (*p=1%*). Underpricing is also higher in IPOs where shares are acquired by more experienced *new* VCs that had no prior involvement in the IPO firm (*p=5%*), and more experienced *existing* VCs who were involved in the firm prior to IPO (*p=10%*). As expected, underpricing is positively related to price revision, hi-tech dummy, and bubble dummy (at the 1% level), as well as loss dummy, price-to-sales, overhang, and lambda (at the 10% level or more), and is negatively related to firm size (*p=5%*), CEO ownership (*p=5%*). Although the results in Model (1) suggest that VCs are likely to acquire shares in underpriced IPOs, they do not however show whether the acquired firms are good quality firms or not.

Model (3) uses the premium as a proxy for firm quality in the short-term around the IPO date. This indicates that IPO premium is positively related to share acquisition by VCs (*p=5%*), consistent with Hypothesis (1b). This suggests that VCs are likely to accept paying a premium which reflects the growth opportunities of acquired firms. Moreover, IPO premium is also significantly and higher in IPOs where the acquiring VC firm has a former relationship with the underwriter, VC-related dummy (*p=5%*). This suggests that VCs related to underwriters are likely to acquire shares in firms with high growth potential. It is also higher in firms where acquiring VCs, new or existing, are more experienced (at the 10% level). Interestingly, a wild test indicates that the positive association between IPO premium and the experience of new acquiring VCs is higher than the one with existing acquiring VCs (at the 10% level). Although Model (2) exhibits a similar, but rather not significant difference, for underpricing, Model (3) indicates that the quality of gifts offered to more experienced-new VCs is marginally better than the ones offered to more experienced-existing VCs. This suggests that a better gift is required to attract outside investors of better quality. The IPO premium is positively related to firm size, underwriter reputation, and overhang, whereas it is weakly negatively related to hi-tech dummy as well as lambda (at the 10% level or more).

Further Models (4) and (5) explore the long-run performance of studied IPOs and show the existence of a positive association between VC share acquisition and the BHAR over one- and two-year periods (at the 5% level), which is consistent with Hypothesis (1c). Similarly, BHAR 1Y and BHAR 2Y are positively related to the presence of a former association between the underwriter and the acquiring VC (at the 1% and 5% levels, respectively). Both long-run performance variables are higher in firms with more experienced new or existing VC investor (at the 10% level or more). Again, the positive association between long-run performance and the

experience of new acquiring VCs is higher than the one with existing acquiring VCs (at the 10% level or more). This is consistent with our results for IPO premium, and it confirms the higher quality of gifts required to attract more experienced outside investors. In terms of control variables, both BHAR 1Y and 2Y are positively related to CEO Ownership, firm size, overhang, and they are negatively related to hi-tech dummy, loss dummy, and lambda (at the 10% level or more).

Findings in Table 3 indicate that VCs acquire shares in underpriced IPO firms that have greater growth opportunities and are likely to have a higher long-run performance. This suggests that VC share acquisition signals the existence of a discount at the time of their IPOs, and the good quality of firms going public. A 10% increase in the percentage of shares acquired by VC firms increases underpricing by 5.38%, this however increases the premium by 4.85%, and the BHAR 1Y and 2Y by 9.92% and 16.44% respectively.

4.3. VC Share Acquisition, Relationship with Underwriters, and IPO Performance

The results in Table 4 suggest the existence of collaborative behavior between underwriters and VCs, where the former is likely to push for a higher underpricing to allow VCs acquire shares in good quality IPO firms. Hence, Table 4 examines the interaction effects of VC share acquisition and VC-Related to Underwriter dummy on IPO performance.

Table 4 Near Here

In line with Hypothesis (2a), Model (6) confirms the results in Table 3 and indicates that underpricing is positively related to VC share acquisition and VC-related dummy (at the 10%

level or more), but it is higher in firms where acquiring VCs are related to underwriters (*p=1%*). A 10% increase VC share acquisition by unrelated VCs to underwriters increases underpricing by 2.16%, and this is 4.01% higher in IPOs where the underwriter had a former relationship with the acquiring VC. Similarly, the IPO premium and both BHAR 1Y and 2Y are higher in firms where the VCs acquire shares in IPOs managed by a formerly related underwriter, consistent with both Hypotheses (2b) and (2c). This suggests that the acquisition of shares by related VCs to underwriters signals the quality of IPO firms. For example, for a 10% share acquisition by unrelated VC to underwriters, the BHAR 2Y increases by 17.12%, and it is 1.87% higher in IPOs where acquiring VCs are related to underwriters. In terms of control variables, the results are consistent with those in Table 3.

4.4. VC Share Acquisition, Experience, and IPO Performance

Although empirical results in Tables 3 and 4 are likely to suggest the existence of a collaborative behavior between underwriters and VCs, they also indicate that VC experience matter. VC firms are keys in finding and nurturing start-ups and leading them to grow and expand. VC partners are technically trained and experienced professionals who develop an in-depth knowledge and expertise of both the business and technological aspects of the firms where they invest their capital. As such, VC experience is an important driver of VC reputation, which extends the VC's social network and contacts and/or gives more expertise in identifying attractive deals and monitoring entrepreneurs (Sorenson and Stuart, 2001). Experienced VCs are thus likely to offer their portfolio companies with value-added services including business referrals, mentoring, and financial support (MacMillan, Kulow, and Khoylian, 1989; Frye, 2003). As we argued earlier, underwriters will seek to establish a relationship with these experienced VCs and will thus

provide larger gifts in the form of buy-in to very attractive IPOs. As such, more experienced VC firms who decide to acquire a larger fraction of shares are likely to invest in more underpriced, i.e., undervalued, IPOs, and those which will enjoy increasing IPO performance. Table 5 examines the interaction effect of (new or existing) acquiring VC experience and VC share acquisition on IPO performance.

Table 5 Near Here

Table 5 shows that underpricing is positively related to VC share acquisition and VC-related dummy (at the 10% level or more), but it is higher in firms where both new and existing acquiring VCs are more experienced (*p=5%*). This is consistent with hypothesis 3a. A 10% increase in VC share ownership increases underpricing by 4.34%, and this is higher in IPOs where new and existing acquiring VCs are more experienced (+0.82% and +0.42% higher underpricing, respectively). Similarly, the IPO premium and both BHAR 1Y and 2Y are higher in firms where both new and existing VCs are more experienced. This is consistent with hypotheses 3b and 3c. This further suggests that experienced VCs are more likely to add value to their portfolio companies. For example, for a 10% share acquisition by VCs, the BHAR 2Y increases by 4.70%, and this is 28.4% higher in case of acquisition by more experienced new VCs and 7.29% higher in IPOs with more experienced existing acquiring VC firms. In line with the results in Tables 3 and 4, the positive association between long-run market performance and VC share acquisition is slightly higher for more experienced-new acquiring VCs than more experienced-existing acquiring VCs (*p=10%*). This suggests the value added of collaborative behavior between underwriters and more experienced-new acquiring VCs. In terms of control variables, the results are consistent with those in Tables 3 and 4.

VI- Conclusion and Discussion

This paper provides empirical evidence on the gift exchange relationship between underwriters and VCs. Using a unique hand-collected data base, we show that VC firms acquire shares at IPO in firms with higher underpricing and premium than a matched sample of VC-backed IPOs selected on the basis of firm size, SIC, and IPO year. They also exhibit higher Long-run aftermarket performance than comparable IPO firms where there was no share acquisition by investors on IPO.

Building on prior research in Loughran and Ritter (2003), and showing how buy-in to an attractive IPO is a form of gift by the underwriter to VCs, our findings suggest the existence of collaborative, rather than collusive behavior between VCs and the underwriters with whom they had a former IPO relationship during the last two years. Using both short- and long-term IPO performance, our results indicate that VC share acquisition is positively related to underpricing and this is higher in IPOs where acquiring VCs have a former IPO relationship with the underwriter. Interestingly, we find that VC share acquisition may play a signaling role and is likely to positively affect the long-run performance, and this is significantly higher when VCs have a former IPO relationship with the underwriters.

Further, we show that the pre-issue involvement of acquiring VCs is likely to intensify the extent to which the offering is underpriced and experiences long-run underperformance when they have a former association with underwriters. This suggests that agency problems are stronger when the acquiring VCs or their related underwriters use their influence to enforce a lower offer price at issuance. This is consistent with a gift exchange perspective where reciprocation allows for increasing economic reward for VCs and increasing power for underwriters.

Despite the limited number observations, we show that there may be differences between new and existing acquiring VCs. As such, we tested the differential effect of new versus existing acquiring VCs experience on IPO performance, and we found tentative evidence of a better quality of the gifts offered to more experienced new VCs compared to the ones offered to more experienced existing VCs. Our evidence suggests that underwriters select outside investors to whom they offered gifts as well as the quality of the offered gifts, and future research might need to control for the endogenous choice of new VCs.

Our empirical investigations show support for a complex framework where loyalty and collaborative behavior between VCs and underwriters is combined with the signaling role played by VC share acquisition. Loughran and Ritter (2002) argue that pre-IPO shareholders focus on the increase of their personal wealth during the IPO process, rather than the level of their wealth. From a behavioral perspective, pre-IPO shareholders would accept to leave a significant amount of money on the table through underpricing that may be allocated by underwriters to loyal investors. Although one may argue that in some circumstances issuers are complacent about severe underpricing, the loyalty between underwriters' IPO investors is limited by the nature of the issuer. Indeed, our findings suggest that underwriters would serve their loyal investors underpriced IPOs with good potential for growth.

Our analyses and findings have a number of implications for management and practitioners. For management of IPO firms, our findings suggest that there are benefits to continuing, extending and deepening relationships with VCs into the longer term, rather than viewing the IPO as signaling an ending or winding down of that relationship. For VCs firms, our findings add to the notion that IPO does not represent an exit. In an environment of difficulties in identifying

attractive early stage ventures, our findings suggest investment opportunities for VCs from committing further to existing investments and extending that relationship.

As all papers, our study has a number of limitations that provide opportunities for further research. We studied IPOs in the US, a liberal economy context with a highly developed stock market. An interesting avenue for additional study would be to examine whether our findings hold in network and emerging economies with less developed stock markets where trust based relationships may be different. Our focus was also on acquisitions by VCs in IPO firms in contrast to acquisitions of shares in established public corporations (PIPEs). Additional research is needed to compare the returns on VC investments in PIPEs with those from investments in IPOs. For example, do PIPEs offer low mean returns with lower variance? Our focus was also on the effect of acquisitions made at time of IPO. Future studies might usefully examine subsequent behavior by VCs. For example, do VCs tend to acquire more shares post-IPO or not? When do VCs tend to effect a complete exit? What is the nature of expertise and board involvement by VCs that acquire shares at IPO? For example, do new acquirers obtain board seats?

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Table 1 – Descriptive Statistics

This table provides descriptive statistics for the sample of 114 IPOs from 1990 to 2008, and compares the sample of IPOs with shares acquisition by VC versus a matched sample of comparable VC-backed IPOs without share acquisition. Matched IPO firms are VC-backed IPOs identified based on firm size, SIC, and IPO year. *VC Share Acquisition* is the percentage of shares acquired from the IPO proceeds. *VC Related dummy* is equal to one if both the underwriter and the VC firms were involved in an IPO deal during the two-year period to the studied IPO date, and zero otherwise. *New VC dummy* is equal to one if the acquiring VC does not have pre-IPO involvement in the IPO firm, zero otherwise. *New Acquiring VC Experience* (and *Existing Acquiring VC Experience)* is equal to the number of IPOs in which new (existing) acquiring VC firm was involved prior to the IPO date. *Market Capitalization* is based on the offer price. *Firm Age* is calculated in years since inception. *Hi-tech dummy* is equal to one if the IPO is a hi-tech firm, and zero otherwise. *Loss dummy* is equal to zero if the last year operating profit is negative, zero otherwise. *Pre-IPO Leverage* is the ratio of total debt over capital in the year preceding the IPO. *Price-to-Sales Ratio* is equal to the market capitalization calculated based on the offer price over the last annual Sales revenue as reported in the IPO prospectus. *Overhang* is equal to the ratio of shares outstanding before the offer to the number of shares offered. *Pre-IPO CEO Ownership* is calculated as a fraction of the shares outstanding prior to the IPO as specified in the IPO prospectus. *Underwriter Reputation* is calculated based on the ranking of Loughran and Ritter (2004) from least to most prestigious (0 to 9, respectively). *Bubble dummy* is equal to one is the IPO occurs during 1999-2000, and zero otherwise. Underpricing is equal to the ratio of the difference between the closing price at the end of the first day of trading and the offer price over the offer price. *Premium* is the ratio of the difference between the offer price and the book value per share over the offer price. Buy-and-Hold Abnormal Returns, *BHARs*, are calculated using a set of comparable VC-backed IPO firms selected based on firm size, SIC, and IPO year. They are calculated based on one, two, and three years following the IPO date. *Pre-IPO VC Syndicate Experience* is equal to the cumulative number of IPOs in which VC syndicate members were involved prior to the IPO date. *VC Location dummy* is equal to one if the IPO firm is located in California or Massachusetts, zero otherwise.

	Total Sample (N=114)		With VC Share Acquisition (N=57)		Without VC Share Acquisition (N=57)		Prob T-test for Difference
	Mean Median	s.d.	Mean Median	s.d.	Mean Median	s.d.	
VC Involvement							
VC Share Acquisition (% Proceeds)	0.041 0.000	0.066	0.082 0.066	0.074			
VC-related to underwriter dummy	0.193 0.000	0.396	0.386 0.000	0.491			
New VC dummy	0.096 0.000	0.297	0.193 0.000	0.398			
New Acquiring VC Exp	3.904 0.000	8.755	7.807 2.000	11.120			
Existing Acquiring VC Exp.	8.009 0.000	17.986	16.018 7.000	22.852			
Firm Characteristics							
Market Capitalization	443.372 288.942	505.342	448.401 289.221	492.873	438.343 264.964	521.849	0.916
Age	14.726 7.019	22.483	21.351 9.000	29.751	8.102 6.378	6.745	0.001***
Hi-tech Dummy	0.167 0.000	0.374	0.158 0.000	0.368	0.175 0.000	0.384	0.804
Loss dummy	0.447 0.000	0.499	0.386 0.000	0.491	0.509 1.000	0.504	0.191
Pre-IPO Leverage	0.240 0.122	0.289	0.208 0.128	0.245	0.273 0.116	0.326	0.231
Price-to-Sales Ratio	0.897	0.909	1.040	0.930	0.753	0.872	0.092*

	0.726		0.823		0.575		
Overhang	3.476	1.946	3.866	2.159	3.085	1.635	0.032**
	3.122		3.158		3.007		
Pre-IPO CEO Ownership	0.149	0.163	0.123	0.154	0.176	0.169	0.082*
	0.079		0.056		0.118		
Underwriter Reputation	7.912	1.555	7.912	1.515	7.912	1.607	1.000
	9.000		9.000		9.000		
Bubble Dummy	0.325	0.470	0.316	0.469	0.333	0.476	0.843
	0.000		0.000		0.000		
IPO Performance							
Price Revision	0.054	0.374	0.023	0.270	0.086	0.455	0.373
	0.000		0.000		0.000		
Underpricing	0.183	0.343	0.255	0.422	0.110	0.220	0.024**
	0.104		0.137		0.072		
Premium	0.752	0.177	0.782	0.179	0.723	0.171	0.073*
	0.785		0.812		0.762		
BHAR1Y	0.076	0.653	0.185	0.508	-0.033	0.761	0.074*
	0.109		0.183		0.015		
BHAR2Y	0.087	0.817	0.310	0.715	-0.136	0.857	0.004***
	0.085		0.265		-0.314		
BHAR3Y	0.008	0.854	0.168	0.652	-0.151	0.999	0.086*
	-0.039		0.308		-0.529		
Instruments							
Pre-IPO VC Syndicate Exp.	27.439	43.687	17.614	29.450	37.263	52.796	0.016**
	11.500		7.000		15.000		
Firm Location dummy	0.246	0.432	0.175	0.384	0.316	0.469	0.083*
	0.000		0.000		0.000		

***, **, and * denote significance at the 1%, 5%, and 10% level (for the two-sided test), respectively.

Table 2 – Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Underpricing	1.000													
2. Premium	0.189	1.000												
3. BHAR 1Y	0.183	0.106	1.000											
4. BHAR 2Y	0.163	0.150	0.552	1.000										
5. VC Share Acquisition	0.348	0.181	0.158	0.225	1.000									
6. VC Related dummy	0.448	0.238	0.286	0.260	0.323	1.000								
7. New VC dummy	0.091	0.294	0.195	0.236	0.064	-0.009	1.000							
8. New Acquiring VC Exp.	0.151	0.123	0.161	0.153	0.239	0.243	-0.143	1.000						
9. Existing Acquiring VC Exp.	0.104	0.094	0.084	0.098	0.245	0.172	-0.096	0.044	1.000					
10. Price Revision	0.383	0.133	0.097	0.172	0.222	0.107	0.148	0.001	0.016	1.000				
11. Market Capitalisation (in $mil.)	-0.084	0.358	0.088	0.070	0.088	0.040	-0.041	0.061	0.171	0.371	1.000			
12. Firm Age	-0.144	0.081	0.028	0.096	0.184	0.005	-0.016	0.249	0.298	0.086	0.141	1.000		
13. Hi-tech dummy	0.538	0.175	-0.096	-0.076	0.053	0.258	-0.066	0.040	-0.021	0.319	0.323	-0.141	1.000	
14. Loss dummy	0.060	0.067	-0.257	-0.204	-0.012	0.052	-0.234	0.004	-0.030	-0.148	-0.083	-0.282	0.118	1.000
15. Pre-IPO Leverage	-0.199	0.027	-0.067	-0.157	-0.034	-0.148	0.014	-0.045	-0.046	-0.242	0.101	0.232	-0.218	-0.116
16. Price-to-Sales Ratio	0.056	-0.148	-0.051	-0.016	0.232	0.024	0.081	0.127	0.102	0.093	-0.142	0.200	-0.105	-0.100
17. Overhang	0.378	0.224	0.133	0.098	0.274	0.275	0.028	0.171	0.226	0.295	0.312	0.013	0.339	0.227
18. Pre-IPO CEO Ownership	-0.199	-0.178	-0.117	0.002	-0.080	-0.204	-0.025	-0.113	-0.099	-0.106	-0.187	-0.073	-0.133	0.037
19. Underwriter Reputation	0.137	0.310	0.013	-0.021	-0.024	0.114	-0.058	-0.015	-0.013	0.044	0.358	0.043	0.147	-0.006
20. Bubble dummy	0.388	0.091	-0.138	-0.128	0.174	0.136	-0.100	-0.029	-0.022	0.192	0.176	-0.256	0.394	0.356
21. Pre-IPO VC Syndicate Exp.	0.009	-0.004	0.034	0.021	-0.137	-0.066	-0.120	0.036	-0.059	-0.215	-0.101	-0.109	-0.053	0.178
22. Firm Location dummy	0.037	0.020	0.048	-0.019	-0.248	-0.021	-0.097	-0.146	-0.172	0.134	0.025	-0.098	0.182	0.019

	15	16	17	18	19	20	21	22
15. Pre-IPO Leverage	1.000							
16. Price-to-Sales Ratio	-0.013	1.000						
17. Overhang	-0.107	-0.055	1.000					
18. Pre-IPO CEO Ownership	0.266	-0.025	-0.214	1.000				
19. Underwriter Reputation	0.023	-0.393	0.222	-0.257	1.000			
20. Bubble dummy	-0.352	0.034	0.306	-0.081	0.063	1.000		
21. Pre-IPO VC Syndicate Exp.	-0.031	-0.048	-0.026	0.049	0.175	0.017	1.000	
22. Firm Location dummy	-0.167	0.088	-0.036	-0.109	-0.112	0.170	0.072	1.000

Table 3 – Two-step Heckman Regression Model for the Association between IPO Performance and VC Share Acquisition at IPO

This table presents the two-step Heckman regression model using the regression results in Model (1) as a first step. It examines the association between IPO Performance and VC Shares Acquisition at the time of IPO for the sample of 114 IPOs from 1990 to 2008. Underpricing is equal to the ratio of the difference between the closing price at the end of the first day of trading and the offer price over the offer price. Buy-and-Hold Abnormal Returns, BHARs, are calculated using a set of comparable VC-backed IPO firms selected based on firm size, SIC, and IPO year. VC Share Acquisition is the percentage of shares acquired from the IPO proceeds.

	VC Acquisition dummy	Underpricing	IPO Premium	BHAR 1Y	BHAR 2Y
	(1)	(2)	(3)	(4)	(5)
Constant	2.793	0.779	-0.140	1.951	3.703*
	2.870	*1.197*	*0.489*	*1.396*	*2.135*
VC Share Acquisition		0.538**	0.485**	0.992**	1.644**
		0.257	*0.236*	*0.439*	*0.666*
VC-Related dummy		0.091***	0.113**	0.429***	0.282**
		0.034	*0.046*	*0.130*	*0.137*
Ln (1+ New Acquiring VC Experience)		0.035**	0.042**a	0.124**a	0.231***b
		0.015	*0.019*	*0.053*	*0.084*
Ln (1+ Existing Acquiring VC Experience)		0.024*	0.008*a	0.010*a	0.049*b
		0.013	*0.004*	*0.006*	*0.028*
Price Revision		0.723***			
		0.260			
LnSize	0.165**	-0.086**	0.029*	0.126*	0.217*
	0.079	*0.043*	*0.016*	*0.074*	*0.120*
Age	0.034***	0.002	0.001	0.004	0.001
	0.013	*0.003*	*0.001*	*0.003*	*0.005*
Hi-tech dummy	0.204	0.426***	-0.059*	-0.266**	-0.440**
	0.389	*0.161*	*0.031*	*0.117*	*0.180*
Loss dummy	-0.262*	0.117**	0.028	-0.289**	-0.331*
	0.156	*0.058*	*0.046*	*0.132*	*0.189*
Pre-IPO Leverage	-1.012**	-0.183	-0.042	-0.190	-0.477
	0.505	*0.240*	*0.093*	*0.268*	*0.432*
Price-to-Sales Ratio	0.047*	0.030**	-0.006	-0.048	-0.085
	0.027	*0.013*	*0.014*	*0.040*	*0.064*
Overhang	0.230**	0.076*	0.006*	0.062**	0.009*
	0.102	*0.045*	*0.003*	*0.026*	*0.005*
Pre-IPO CEO Ownership	-0.926**	-0.226**	-0.034	0.310*	0.689**
	0.423	*0.112*	*0.130*	*0.188*	*0.290*
Underwriter Reputation	-0.014	0.057*	0.033**	0.054	0.010
	0.106	*0.031*	*0.016*	*0.054*	*0.087*
Bubble dummy		0.173***	0.005	-0.033	-0.063
		0.055	*0.053*	*0.148*	*0.227*
Pre-IPO VC Syndicate Experience	-0.004**				
	0.002				
Firm Location dummy	-0.545***				
	0.209				
Lambda		0.401**	-0.057*	-0.201*	-0.376*
		0.161	*0.030*	*0.113*	*0.213*
Wald chi2		65.200	45.120	46.440	42.690
Prob > chi2		0.000	0.000	0.000	0.000
Number of Observations		114	114	114	110

Heteroskedasticity-consistent standard errors are reported in italic beneath the coefficient estimates.

***, **, and * denote significance at the 1%, 5%, and 10% level (for the two-sided test), respectively.
[(a)], [(b)]: significantly different at the 10%, and 5% level, respectively.

Table 4 – IPO Performance, VC Share Acquisition, and the Moderating Role of VC-Underwriter Relationship

This table presents the two-step Heckman regression model using the regression results in Model (1)-Table 3 as a first step. It examines the association between IPO Performance and VC Shares Acquisition at the time of IPO for the sample of 114 IPOs from 1990 to 2008. It also considers the moderating effect of the association between the VC firm and the underwriter.

	Underpricing (6)	IPO Premium (7)	BHAR 1Y (8)	BHAR 2Y (9)
Constant	1.049	-0.052	1.990	3.688*
	1.154	*0.465*	*1.399*	*2.147*
VC Share Acquisition	0.216**	0.437	0.796*	1.712**
	0.100	*0.323*	*0.475*	*0.729*
VC-Related dummy	0.064*	0.048*	0.390**	0.296***
	0.037	*0.028*	*0.168*	*0.105*
VC Share Acquisition x VC-Related dummy	0.401***	1.269**	0.055***	0.187*
	0.116	*0.508*	*0.015*	*0.101*
Ln (1+ New Acquiring VC Experience)	0.029**	0.048***	0.126**a	0.229***b
	0.013	*0.018*	*0.053*	*0.085*
Ln (1+ Existing Acquiring VC Experience)	0.019*	0.009**	0.011*a	0.050*b
	0.011	*0.004*	*0.006*	*0.027*
Price Revision	0.678***			
	0.250			
LnSize	-0.076*	0.032*	0.124*	0.217*
	0.042	*0.016*	*0.074*	*0.120*
Age	0.003	0.001	0.004	0.001
	0.003	*0.001*	*0.003*	*0.005*
Hi-tech dummy	0.423	-0.062*	-0.265**	-0.440**
	0.154	*0.032*	*0.117*	*0.180*
Loss dummy	0.112**	0.027	-0.281**	-0.334*
	0.056	*0.044*	*0.134*	*0.191*
Pre-IPO Leverage	-0.182	-0.039	-0.189	-0.479
	0.230	*0.089*	*0.268*	*0.432*
Price-to-Sales Ratio	0.030**	-0.011	-0.050	-0.084
	0.013	*0.013*	*0.040*	*0.065*
Overhang	0.067*	0.007*	0.060**	0.009*
	0.039	*0.004*	*0.026*	*0.005*
Pre-IPO CEO Ownership	-0.214**	-0.045	0.318*	0.688**
	0.108	*0.124*	*0.188*	*0.290*
Underwriter Reputation	0.056*	0.033**	0.059	0.012
	0.030	*0.019*	*0.056*	*0.090*
Bubble dummy	0.133***	0.005	-0.034	-0.064
	0.050	*0.051*	*0.148*	*0.227*
Lambda	0.384**	-0.051*	-0.199	-0.375
	0.155	*0.029*	*0.113*	*0.213*
Wald chi2	80.420	56.340	46.710	42.720
Prob > chi2	0.000	0.000	0.000	0.000
Number of Observations	114	114	114	110

Heteroskedasticity-consistent standard errors are reported in italic beneath the coefficient estimates.
***, **, and * denote significance at the 1%, 5%, and 10% level (for the two-sided test), respectively.
(a), (b): significantly different at the 10%, and 5% level, respectively.

Table 5 – IPO Performance, VC Share Acquisition, and the Moderating Role of VC-Experience

This table presents the two-step Heckman regression model using the regression results in Model (1)-Table 3 as a first step. It examines the association between IPO Performance and VC Shares Acquisition at the time of IPO for the sample of 114 IPOs from 1990 to 2008. It also considers the moderating effect of New and Existing Acquiring VC Experience.

	Underpricing (10)	IPO Premium (11)	BHAR 1Y (12)	BHAR 2Y (13)
Constant	0.787	-0.166	1.631	3.131
	1.233	*0.487*	*1.308*	*2.031*
VC Share Acquisition	0.088*	0.197***	0.202*	0.470**
	0.050	*0.072*	*0.115*	*0.213*
VC-Related dummy	0.076**	0.111**	0.454***	0.316*
	0.036	*0.047*	*0.125*	*0.179*
Ln (1 + New Acquiring VC Experience)	0.011*	0.030*	0.011*	0.017*
	0.007	*0.018*	*0.007*	*0.009*
Ln (1+New Acq. VC Exp.) x VC Share Acquisition	0.082**	0.179**	1.737***b	2.840***b
	0.039	*0.081*	*0.652*	*1.073*
Ln (1+ Existing Acquiring VC Experience)	0.008	0.019	0.041	0.043
	0.006	*0.029*	*0.078*	*0.119*
Ln (1+Existing Acq. VC Exp.) x VC Share Acquisition	0.042**	0.119*	0.377**b	0.729**b
	0.021	*0.063*	*0.168*	*0.344*
Price Revision	0.747***			
	0.269			
LnSize	-0.082**	0.033*	0.119*	0.205*
	0.041	*0.017*	*0.070*	*0.114*
Age	0.002	0.001	0.002	0.000
	0.003	*0.001*	*0.003*	*0.005*
Hi-tech dummy	0.442	-0.055*	-0.249**	-0.411**
	0.167	*0.031*	*0.111*	*0.174*
Loss dummy	0.112*	0.031	-0.284**	-0.320*
	0.060	*0.046*	*0.123*	*0.198*
Pre-IPO Leverage	-0.210	-0.002	-0.160	-0.562
	0.251	*0.094*	*0.254*	*0.415*
Price-to-Sales Ratio	0.029**	-0.007	-0.062	-0.098
	0.013	*0.014*	*0.037*	*0.061*
Overhang	0.067*	0.008*	0.061**	0.009*
	0.040	*0.004*	*0.025*	*0.005*
Pre-IPO CEO Ownership	-0.238**	-0.047	0.317*	0.613**
	0.119	*0.135*	*0.182*	*0.286*
Underwriter Reputation	0.059**	0.033*	0.062	0.003
	0.030	0.019	0.051	0.082
Bubble dummy	0.135**	0.004	-0.032	-0.057
	0.054	*0.056*	*0.149*	*0.226*
Lambda	0.413	-0.068**	-0.169	-0.411
	0.251	*0.033*	*0.089*	*0.201*
Wald chi2	61.770	46.650	60.950	43.395
Prob > chi2	0.000	0.000	0.000	0.000
Number of Observations	114	114	114	110

Heteroskedasticity-consistent standard errors are reported in italic beneath the coefficient estimates.
***, **, and * denote significance at the 1%, 5%, and 10% level (for the two-sided test), respectively.
(b): significantly different at the 10%, and 5% level, respectively.